

REMARKS

This request for reconsideration is filed in response to the final Office Action dated February 21, 2008. In view of these remarks, this application should be allowed and the case passed to issue.

Claims 2-12 are pending in this application. Claims 2-11 are allowed. Claim 12 is rejected. Claim 1 was previously canceled.

Allowable Subject Matter

Claims 2-11 are allowed.

Applicants gratefully acknowledge the indication of allowed claims.

Claim Rejections Under 35 U.S.C. §§ 102 and 103

Claim 12 was rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Badwal et al. (Solid State Ionics, 2000 V136-137, pp 91-99).

Claim 12 was rejected under 35 U.S.C. § 102(b) as anticipated by Tanaka et al. (US 4,328,296).

These rejections are traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the invention, as claimed, and the cited prior art.

Claim 12 requires a solid electrolyte obtained by a spark plasma method produced by preparing solid electrolyte material with a composition expressed by a formula: $(1-x) \text{ZrO}_2 + x\text{Sc}_2\text{O}_3$ (where x is a number equal to or greater than 0.05 and equal to or less than 0.15) wherein suppose that an X-ray diffraction intensity is I, the solid electrolyte has a cubic crystal ratio, $[I(\text{cubic crystal: } 220) / \{I(\text{cubic crystal: } 220) + I(\beta\text{-phase: } 220)\}] \times 100 (\%)$, equal to or greater

than 90 %. The solid electrolyte is provided by sintering the solid electrolyte material to obtain sintered material while applying a first compression load to the solid electrolyte material at a level equal to or less than 40 MPa; and cooling the sintered material to obtain the solid electrolyte while applying a second compression load, less than the first compression load, to the sintered material, wherein the second compression load has a value equal to or greater than 10 MPa and equal to or less than 15 MPa, as required by claim 12.

The claimed solid electrolyte has an unexpected improvement in ion conductivity, as shown in Table 1 (solid electrolytes according to the present invention) and Table 4 (comparative solid electrolytes). The present invention improves the ionic conductivity of Sc_2O_3 stabilized zirconia by effectively omitting the β -phase in the temperature range equal to or greater than 400 °C and equal to or less than 900 °C, thus minimizing the crystallite size. The solid electrolyte according to claim 12 exhibits high ionic conductivity over a wide temperature range, including low temperatures even in variations in reacting temperatures, and avoids the occurrence of phase changes to provide improved stability to the crystal structure.

Badwal et al. and Tanaka et al. do not disclose or suggest the claimed solid electrolyte.

Badwal et al. disclose scandia-zirconia electrolytes for intermediate temperature solid oxide fuel cell operation. Badwal et al. add about 9 mol% of Sc_2O_3 , however Badwal et al. is silent about the claimed structure. There is no teaching or suggestion in Badwal et al. of the influence of the β -phase on the claimed structure, of minimizing the crystallite size, and effectively omitting the β -phase. There is no teaching or suggestion in Badwal et al. of the relationship $[I(\text{cubic crystal}: 220) / \{I(\text{cubic crystal}: 220) + I(\beta\text{-phase}: 220)\}] \times 100 (\%)$, equal to or greater than 90 %, wherein I is the X-ray diffraction intensity, as required by claim 12.

Tanaka et al. disclose solid electrolytes for use in an oxygen concentration sensor.

Tanaka et al. teach adding about 6.5 to 7 mol% of Sc₂O₃, and the monoclinic crystal phase.

However the monoclinic crystal phase of Tanaka et al. is not the β-phase. There is no teaching or suggestion in Tanaka et al. of the influence of the β-phase on the claimed structure and of effectively omitting the β-phase. There is no teaching or suggestion in Tanaka et al. of the relationship [I (cubic crystal: 220) / {I (cubic crystal: 220) + I (β-phase: 220)}]×100 (%), equal to or greater than 90 %, wherein I is the X-ray diffraction intensity, as required by claim 12.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the disclosure in a single reference of each element of a claimed invention. *Helifix Ltd. v. Blok-Lok Ltd.*, 208 F.3d 1339, 54 USPQ2d 1299 (Fed. Cir. 2000); *Electro Medical Systems S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 32 USPQ2d 1017 (Fed. Cir. 1994); *Hoover Group, Inc. v. Custom Metalcraft, Inc.*, 66 F.3d 399, 36 USPQ2d 1101 (Fed. Cir. 1995); *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051 (Fed. Cir. 1987). Because Badwal et al. and Tanaka et al. do not disclose [I (cubic crystal: 220) / {I (cubic crystal: 220) + I (β-phase: 220)}]×100 (%), equal to or greater than 90 %, as required by claim 12, Badwal et al. and Tanaka et al. do not anticipate claim 12.

Applicants further submit that Badwal et al. and Tanaka et al., whether taken in combination, or taken alone, do not suggest the claimed solid electrolyte.

In view of the above remarks, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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